

THE AMERICAN JOURNAL  
OF  
OPHTHALMOLOGY.

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VOL. XXIII.

JANUARY, 1906.

No. 1.

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ORIGINAL ARTICLES.

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THE TREATMENT OF RECENT EMBOLISM OF THE  
RETINAL ARTERIES BY DIGITAL MASSAGE.\*

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MILWAUKEE.

OCTOBER, 1901, I reported<sup>1</sup> two cases of recent embolism of the central retinal artery, in one of which all visual functions were restored to the normal, and in the other partly cured, by deep digital massage.

Owing to the rarity of the affection, and especially the fact that cases are few in which the clot has become impacted in the vessel only a few hours or days before examination, the experience of any one observer can certainly be limited. I therefore have welcomed the opportunity of examining and treating the few cases that have applied to me, especially as the results of treatment have been uniformly successful.

For several years I awaited the arrival of a new patient with recent embolism, but saw none, although two cases of ancient embolism were examined—but of course not treated, as I believe “there is no treatment” for old cases. I have since met and treated three additional recent cases, the histories of which are herewith detailed.

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\*Read at the 10th annual meeting of the American Academy of Ophthalmology and Oto-Laryngology, Buffalo, Sept. 14th to 16th, 1905.

Diverse opinions upon the prognosis of retinal embolism exist. Riemar<sup>2</sup> says that in the cases of either embolism or thrombosis we must expect total blindness and granular breaking up of the blood column in the vessels concerned. In his article of June, 1899, Casey A. Wood<sup>3</sup> reports five cases of retinal embolism that came under his care. Case I had complete blindness, which partially spontaneously recovered. He asks, "What curative value would have been assigned to the use of massage, iridectomy, paracentesis corneæ, sclerotomy or eserine, if any of these forms of treatment had been resorted to in this case as soon as the blindness had been observed?" Dr. Wood is optimistic when he says that "The fact that must always be reckoned with in estimating the value of any remedial measures for retinal embolism is the tendency of almost every case to improve, with or without treatment." Others are not so sanguine. Recent text books advise iridectomy and paracentesis, but I fail to find any case in the literature that has been benefited by these procedures. Amyl nitrate inhalations have been suggested by Gifford.<sup>4</sup> Forceful ocular massage seems to give the best results. "Its reputation rests upon a few successful cases."<sup>5</sup>

The earliest case reported as treated by massage that I can find was by Ehrle<sup>6</sup> who, in describing 21 cases of partial and complete embolism (the percentage being 1:3000 in clinic or 1:1600 in private practice), states that *one* case received better vision after treatment by massage; in other cases iridectomy and paracentesis were done without any result.

I have collated all the cases I could find that have been treated by this method, abstracts of which are herewith presented. The cases of Mules,<sup>7</sup> Hirschberg,<sup>8</sup> Hilbert<sup>9</sup> and Fischer<sup>10</sup> are said to have been completely cured. Of Casey A. Wood's<sup>11</sup> four cases treated by massage, none were cured, but these were apparently benefited by the combination of treatment. Full recovery has ensued in two of my own; the other two have been benefited, and in the last one, seen since this article was read, there was no result from any form of treatment.

It seems to be the general opinion that an embolism impacted in the central artery of the retina or its branches,

or a thrombus formed therein, causes immediate total blindness of the area supplied by that vessel, and that in most cases this is permanent. This is certain if the clot completely plugs the vessel, thereby cutting off the nutrition of the retina, for then atrophic processes ensue. The force of the blood current certainly tends to drive the clot in tighter and to more completely cut off the circulation. We cannot expect to see a thrombus become absorbed within a few hours or days. Absorption of a blood clot, we know, is ever a matter of a week, or perhaps many weeks; or possibly it may become organized and remain as fibrous tissue. Aids to absorption may be found in those remedies which rapidly change the blood, i. e., diaphoretics, purgatives and alteratives, but none of these can effect a mechanical change in either moving the clot, breaking it up, or changing its position. Surgical procedures, such as paracentesis and iridectomy, temporarily change the intra-ocular tension, and have been recommended, but I can find no case in which the cure of retinal embolism could reasonably be ascribed to these procedures.

We can, however, sometimes move an embolus in the retinal arteries by pressing or rubbing the eyeball, even though it be in the optic nerve back of the eye. Should it be a hard clot, it may probably be tilted or turned in the lumen of the vessel, allowing some of the blood stream to pass. It may be broken up into fine enough particles to permit of it passing into the smallest vessels where the disturbance of nutrition would be very slight and absorption would more rapidly take place. The same may be said of a thrombus formed at this site, but the latter is apt to be large and soft. It will be liable to fully choke up the vessels, and no method likely to secure dislodgment or disintegration. Such cases remain permanently blind and cannot be cured by any form of treatment.

I ascribe the success of the treatment in my cases mainly to the massage, which permitted a flow of blood past the obstruction and kept up the retinal nutrition until sufficient absorption of the clot had taken place.

In support of my contention as to the curability of the affection in the early stages, I offer the following clinical reports:

CASE 1: Ehrle<sup>12</sup> in describing 21 cases of partial and complete embolism, states that one case received better vision after massage.

Fischer's<sup>13</sup> admirable monograph of 246 pages is based upon one case.

CASE 2: Total embolism in a healthy woman. Sudden and total blindness. Seen two hours after the attack; treated by lengthy massage (one-half hour and more at each sitting, apparently once a day for over a month) and K. I. Immediate improvement after first massage to perception of light. Fischer could observe the circulation return under pressure of the fingers. A scotoma remained for a month, but six weeks after the attack the vision was  $\frac{6}{6}$ , with full V. P. About four months later the patient died of an abortion.

CASE 3: Mules<sup>14</sup> had a case of partial embolism (of the inferior retinal artery) which he treated by massage, which entirely recovered function.

CASE 4: Hirschberg<sup>15</sup> reported a case of an *old* embolism of the inferior temporal retinal artery, which soon after strong massage upon the posterior temporal side of the eyeball towards the nose, in the course of about a minute improved the vision, which in a little while became normal.

CASE 5: Hilbert<sup>16</sup> had a similar case of embolism of the inferior temporal artery which was rapidly cured by massage.

Casey A. Wood<sup>17</sup> reports the following four cases.

CASE 6: There was a partial embolism in an apparently healthy subject ( $V=\frac{20}{40}$ , Jaeger 1 when held above horizon, lower half of V.F. wanting). Massage (one treatment) immediately after attack by Dr. Hotz; no result; iridectomy (11th day of disease); gradual improvement in central vision ( $V=\frac{20}{20}$  almost, and Jaeger 1 at 14 inches) and extension of the visual field (remained hemiopic, but increased downwards and temporally).

CASE 7: There was total embolism of the left artery; organic disease of the heart; retention of a small island of percipient retina; (total blindness at first); treatment by massage (5 days) with slight improvement. ( $V$ =outlines of large objects, V.F.=an island of 2 to 3 degrees inner aspect of retina).

CASE 8: Total embolism in a healthy woman; seen

second day. V=doubtful perception of light with focal illumination; immediate massage, repeated four to six times a day (5 days); iridectomy seventh day. Six months later V=fingers at 2 feet, V.F.=island of about 5 degrees around fixation point.

CASE 9: Total embolism in a patient subject to cardiac disease; preservation of partial vision by cilio-retinal vessels; treatment of small avail. Seen first day after attack,  $V=\frac{20}{100}$ . Jaeger 16 eccentrically, V.F.=island of about 6 to 7 degrees at central point. Immediate massage, amyl nitrate inhalations for over a week. Six weeks later  $V=\frac{2}{7}$ , Jaeger 14. V.F. increased to an oblong area  $5^{\circ} \times 15^{\circ}$  to temporal side of fixation point.

CASE 10: Fraenkel, Fritz,<sup>18</sup> reports a case of injury from exertion of shoving a piece of wood under a wagon wheel, causing total and sudden blindness from closure of central artery; seen thirty-three hours after onset. Treatment by pilocarpine, light massage; third day, paracentesis, atropine. Paracentesis repeated twice during a week. Cilio-retinal vessel found to supply a section of retina alongside of optic nerve about  $1\frac{1}{2}$  times size of nerve head. (Apparently similar to my case No. 13\*) Result, 17th day,  $V=\frac{6}{60}$  and No. 13 at Jaeger at .35.

My first cases treated by massage were published October, 1901, in the *Annals of Ophthalmology*.<sup>19</sup>

CASE 11: At first total embolism following menstrual period; woman of 29; total sudden loss of sight six days before. Deep massage, pilocarpine sweats, salines, and K.I. Perception of light in 24 hours. Six days of forcible massage, twice a day; then could see small objects. Large central scotoma; V.F.= $\frac{6}{6}$ , Sn. 0.50 at .50; V.F. normal, except small paracentral scotoma. Later this disappeared and vision has remained normal.

CASE 12: Hard drinker, said to have heart trouble; physical examination negative. At first, total, subsequently, partial embolism; sudden blindness three weeks before. V=movement of hand. Massage, K. I. Restoration of cir-

\* Genth (Arch. f. Augkd., ii, i) reports a case of similar nature resulting in atrophy of papilla, but eccentric V.  $\frac{1}{100}$  in a triangular area contiguous to temporal margin of disc extending half way to macula.

culation in superior retinal vessels, clot forced into inferior by massage. Result = hemiopic field, V. eccentric= $\frac{2}{40}$ .

Since that time I have used massage in the following two cases, which I report more in detail.

CASE 13: P. M. O., aged 40 years, a full blooded, apparently healthy man, weighing about 225 pounds, a free liver, no history or signs of syphilis, rheumatism, heart or kidney disease or diabetes; urine sp. gr. 1034. Came December 18, 1903, with a typical total embolism of the left central artery, which had come upon him the previous day at 4:30 P. M. The arteries carried no blood, the veins were full, but not

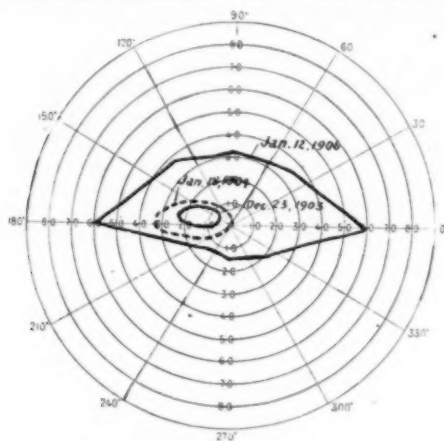


Fig. 1.

very tortuous, disc very pale, the typical cherry-red spot at the macula was particularly prominent. V=faint perception of light; R.E. normal. He gave history of having had several attacks of transient, but not total, blindness in the left eye during the previous year, but each time completely recovered his vision. I massaged the eye with thumb pressure; ophthalmoscopic examination made immediately afterwards showed that some blood entered the retinal arteries and that the disc became pink; sensation of light and form returned. He was sent to the hospital and digital massage given twice a day, daily pilocarpine sweats and iodide of potash, as in previous cases. Five days later, there was more improvement, V= $\frac{6}{40}$ . Could read Sn. 1.00 at 0.50 (ordinary print) letter by letter if he looked slightly eccentrically. The visual field could now be taken and showed an extreme contraction. (See Fig. 1).



The main retinal arteries carried but little blood, and the color of the fundus was very pale, but the optic nerve head was pinkish, especially to the macular side; an irregular island, about the size of the optic disc, was of a brilliant red color, and to this proceeded two accessory arteries from the optic disc. This was the only functioning portion of the retina. This area did not change in appearance, but the

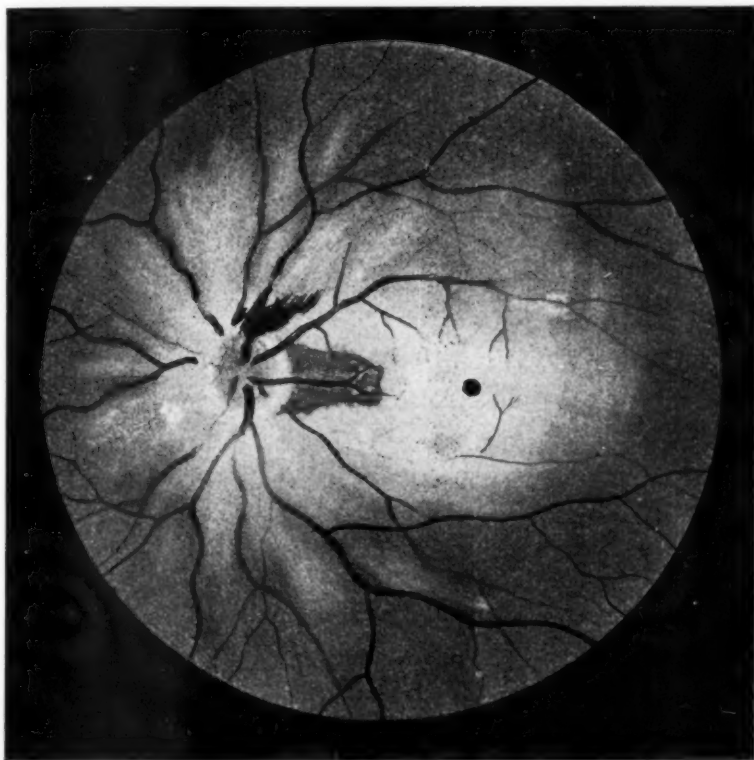


Plate I.

CASE 13. Reproduction from colored drawing of fundus, Dec. 18, 1903.

portion of the visual field corresponding to it slightly enlarged, the remainder of the field being absent. Several massage treatments were given in the office with the Bilmayer vibrator. He returned home December 24th, being given iodonucleoids, as his digestion was disturbed by the potassium iodide. January 18, 1904, the field was several times the size,  $V=6/40$  eccentrically as before (See Fig. 1). He was

then advised that nothing could be hoped for from treatment and directed to discontinue same.

He returned January 12, 1906, having had no treatment for one year. L.E.  $V=6/60$ . V. F. greatly enlarged above, having now a hemianopic character (see Fig. 1). The appearances had likewise undergone considerable change (see Plate II). The nerve atrophic, slightly cupped, the arteries

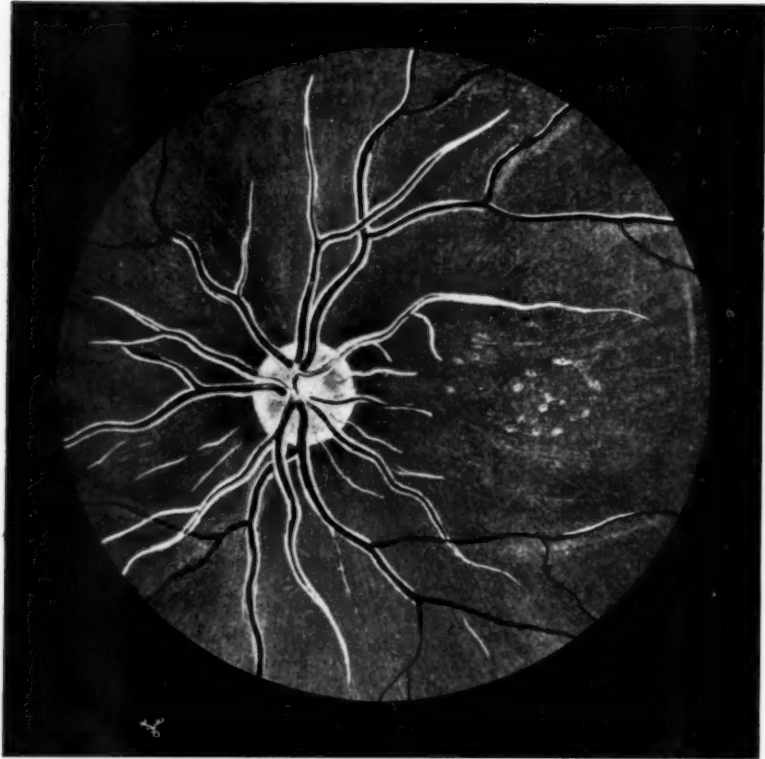


Plate II.

CASE 13. Reproduction from colored drawing of fundus, Jan. 12, 1906.

very small and accompanied by whitish lines of considerable thickness and could be traced only two to three disc diameters away from their entrance, the veins smaller and also showing sclerosis of their walls, the retina atrophic and complete disappearance of the dark colored island which proceeded from the optic disc (see Plate I).



This is a rare example of accessory retinal arteries, which being derived from the chorioid plexus, had no connection with the clot in the central artery. In this case I do not think the treatment was of the least effect, but that the partial restoration of function was due to the anomalous arteries.

CASE 14: A. K., aged 21, farmer, consulted me September 16, 1904, stating that total blindness of the left eye had occurred suddenly six days before while at state fair. There had been some improvement of vision, and on examination the vision was  $\frac{2}{40}$  in the affected eye; the other eye full  $\frac{6}{6}$ . Visual field could not be taken, but was evidently contracted. He had hypertrophied left ventricle and mitral regurgitation. Said he had had some rheumatism and six months before had quinsy. Ophthalmoscopic examination showed typical total embolism, the optic nerve and surrounding retina being edematous, there being several small hæmorrhages near the courses of the main arteries; the cherry-red spot was typical. Immediately following the ophthalmoscopic examination I made forcible digital massage for about two minutes. Again examining the case with the ophthalmoscope, I found that the contracted arteries were carrying blood, that the veins were less dilated, and the patient expressed himself as seeing better. The massage was then continued for about ten minutes. Patient returned three days later, was sent to the hospital, given pilocarpine sweats, and iodide of potash internally. Hot applications were made to the eye for one-half hour on every third hour; dionin (10 per cent.) was instilled twice a day for two days. The massage was repeated in the evening, three times the next day, and twice a day for the following four days. After the massage the eye became very tender and the procedure could not be forcibly applied. A number of more hæmorrhages appeared in the fundus, but on the third day the vision was increased to  $\frac{6}{24}$ , and the visual field became larger. At no time was there any scotoma. He returned home after having ten treatments by digital massage, being in the hospital eleven days, during which time he received ten pilocarpine sweats, taking increasing doses of iodide of potash. His vision was then  $\frac{6}{7}$ . He was again seen twelve days later, when the vision was  $+\frac{6}{8}$ . Several office treatments were

then given by the Bilmayer vibrator. He returned to his home and continued taking the iodide of potash. Returned December 31st (three and one-half months after the first examination), which was the last time he has been seen. His vision was then  $\frac{6}{6}$ , the fundus nearly normal, and the visual field the same as when taken September 30th. He has gained 25 pounds since treatment, weighing 210 pounds.

CASE 15: O. K. R., aged 54, had right hemiplegia with motor aphasia three months ago. (Seen December 30, 1905). He noticed that the sight of the right eye became dim but recovered from time to time since the attack, but for several weeks had been blind. I was called in consultation by Dr. Noer, to his home in Stoughton, Wis., and found typical picture of total retinal embolism, general arterio-sclerosis, partial recovery from aphasia and nearly complete recovery from the hemiplegia. Diagnosis, cerebral hæmorrhage over speech centers, probable embolus carried to eye or endarteritis of ophthalmic artery with formation of large thrombus. Massage and the other methods advised above were given for ten days or more by Dr. Noer, but given up, as the eye remained blind. I did not see the case again, and my final diagnosis of the eye lesion is endarteritis with formation of large thrombus. Hence the failure of massage in this case.

Fischer observed his own case very carefully, making ophthalmoscopic examinations during the sittings in which the massage was given. The patient bore the treatment very well and for a long time. At first sitting he gave a full half hour of massage. The next day there was some extravasation about the papilla, which he believed to be due to diapedesis. These small hæmorrhages were absorbed and had no permanent effect.

In Hirschberg's case, immediately after treatment there was irritation, pain, lacrimation and photophobia, supposed to be due to the return of function.

Barkau<sup>20</sup> forces the eyeball back into the orbit, holding it 30 seconds, then suddenly relaxing the pressure, and claims to have cured one case.

Casey A. Wood does not believe in such heroic treatment. "I do not believe that, with the majority of American patients at least, it is possible to keep up effective kneading of

the globe for more than two or three minutes at a time, and it seems more rational to attempt to accomplish this two or three times daily than to continue the massage half an hour once a day." I think that Wood's patients are not treated heroically enough and that perhaps he might have had better results if he had been more persistent and forcible in the massage. While all my patients have certainly deemed the energetic massage I gave them a severe treatment, yet they have stood it well and the results have certainly warranted the procedure. No other method of treatment has ever given any such results. If partial or complete recoveries have followed iridectomy or paracentesis, such would probably have happened from a *laissez faire* policy or from the absorption treatment (K. I., pilocarpine, etc.). These eyes are doomed to blindness unless we can immediately dislodge the clot or break it up sufficiently to allow enough blood to pass through the vessel to give nutrition to the retina. No damage has been done by massage in this connection, and even if such be possible, the procedure can be borne by the patient with sufficient grace to warrant its application.

I apply the following method: After instillation of two drops of 5 per cent. cocaine or 1 per cent. holocaine solution, a little vaseline is put into the eye, the operator stands in front of the patient who is in a sitting or lying position; one hand is placed back of the patient's neck to steady the head, and the thumb of the other pressed deeply between the eyeball and the wall of the orbit, the lids being closed, almost dislocating or gouging out the eye. Then with a slow, rotary motion the thumb is passed round the eyeball, the pressure being suddenly released and then repeated. This procedure is kept up for five to ten minutes—until the patient can stand the pressure no longer and calls for its stoppage. The treatment is made three times a day at first, then twice, and then once daily. The largest number of such treatments was given in my last case, being ten in six days. In three of the cases half a dozen office treatments were given by the electric vibrator once a day, after digital massage had been stopped. I have recently been using suction vibrator attached to the Pyncheon pump on the Victor electric apparatus, for the purpose of increasing the blood supply to the optic nerve and

retina in cases of atrophy, and believe such would be applicable to the treatment of embolism and thrombosis.

All these patient's had hot compresses one-half hour on every third hour during the day for the first week, from four to eight pilocarpine sweats, and large doses of the iodide of potash for several weeks, medication by iodides being continued for a month or more in smaller dosage. After the third or fourth treatment the eyeballs become tender to touch and cannot be so forcibly rubbed, but in no case has any inflammation been produced nor has dislocation of the lens or retina followed. Even if such an accident should occur, the risk is well worth the taking, as these cases are otherwise hopeless.

I, therefore, strongly recommend forcible, deep, digital massage as the main hope of relief for recent retinal embolism.

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- <sup>2</sup> Riemer, *Arch. f. Augenh.*, March, 1899.
- <sup>3</sup> Wood, Casey A., *Ophth. Record*, June, 1899.
- <sup>4</sup> Gifford.
- <sup>5</sup> Hansel and Sweet, *Dis. of Eye*, p. 476, 1903.
- <sup>6</sup> Ehrle, *Inaug. Diss. Tuebingen*, 1896.
- <sup>7</sup> Mules, vide Fischer, p. 244.
- <sup>8</sup> Hirschberg, vide Fischer, p. 244.
- <sup>9</sup> Hilbert, vide Fischer, p. 244.
- <sup>10</sup> Fischer, R., *Embolie der Arteria Centralis Retinae*, Leipzig, 1891.
- <sup>11</sup> Wood, loc. cit.
- <sup>12</sup> Do <sup>17</sup> loc. cit.
- <sup>18</sup> Das Freibleiben eines parapillaren Theils der Netzhaut bei plötzlichem Verschlusse der Centralarterie. *Arch. f. Aughkde.*, xlix, 1, 1903.
- <sup>19</sup> Würdemann, loc. cit.
- <sup>20</sup> Barkau, vide Hansell and Sweet, p. 362.

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#### EDITORIAL NOTICE.

The next meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held at Detroit, Mich., on August 30th, 31st, and September 1st, 1906.

DISCUSSION ON  
RETINAL CHANGES AS AN AID TO DIAGNOSIS IN VASCULAR  
DEGENERATION,\*

BY THOMAS A. WOODRUFF, M.D.

AND

THE TREATMENT OF RECENT EMBOLISM OF THE RETINAL  
ARTERIES BY DIGITAL MASSAGE,

BY H. V. WURDEMAN, M.D.

DR. CASEY WOOD (Chicago): I would like to say something about both these papers. I think the paper of Dr. Woodruff ought to interest all of us. I have felt that we have not done our duty to the profession in general in that we have not taken full advantage of the fact that we see in the back part of the eye as nowhere else the bloodvessels and the minute changes going on. I do not think we have advanced in five years in determining from these visible vessels, and in assisting the general practitioner in, the diagnosis of systemic disturbances, and I think there is a large field there and much to be done. I think it is the duty of every man who is able to associate a definite change with some well-defined systemic condition, to publish such cases, and in the course of time we may be able to form decided opinions as to what is taking place from the mere appearance of the fundus alone. Coming to the matter of the crossing of an artery by a vein, it might be further studied. I have not so definitely decided as he upon the value of prognosis and diagnosis from the changes that occur and the relative conditions of the vessels at that point; but I have investigated some cases in consultation with Dr. Woodruff, and the condition he has outlined certainly does appear. I think we need a very large number of observations and they ought to be made definite without these references to sclerotic changes and other indefinite terms. We should give up being ophthalmologists alone and should study general pathology and determine as definitely as possible what are the changes of the minute vessels throughout the body. We will find that they correspond very closely to the changes in the eye, and I believe it is well worthy of our study. I believe also that in the rush of private practice and clinical examin-

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\* See December number of this journal.

ations we do not examine the fundus with the ophthalmoscope, especially the periphery, with the care that we might, always being on the look out for these very minute changes. The gross lesions are, of course, important, but the most minute changes we can see are the ones which are the most important of all from the standpoint of the general practitioner.

DR. E. E. BLAAUW (Buffalo): I should like to say a few words on the last paper in regard to the question of embolism. I do not doubt the diagnostic experience of Dr. Würdemann, but I do doubt his conclusions. I doubt if these cases were embolism. These things can only be diagnosticated with the microscope, and in all these cases that have been examined the condition found was an arterio-sclerosis of the vessels of the optic nerve. The most elaborate paper on this subject is in the last edition of Graefe's Archiv., 61 Bd. For arterio-sclerosis speaks the intermittency mentioned by Dr. Würdemann, the absence of valvular lesions, the onset after f. i., and the loss of blood as in one case of Dr. Würdemann. In true embolism we can do nothing; these cases are very rare. The oculist sees the changes of the vessels around the disc, and the most pronounced at the disc. They are not so marked in the periphery. The older the patient is the better the prognosis. I have seen a case of 77, of so-called retinitis hæmorrhagica, and the patient is living two years later.

DR. KNAPP (New York): I have seen a moderate number of these cases, in which the changes were all around the macular region, which was free, and they are not so very rare. I have also seen a number of cases where the macular vessels were impervious, blocking the macular region, and then their area is gray, at times with hæmorrhages, especially at the border. [Dr. Knapp illustrated with chalk the two kinds of cases.] Total embolism, I have never seen cured. There may have been some cases reported, but they are rare, and the disease is not. I have used pressure, but not in the manner of the lecturer, but gradually and gently. I think it not wise to do it forcibly. Endarteriitis is the chief cause of this blocking of the arteries, and not embolism. The same process is seen oftener in the brain than in the eye, and I remember a few cases which were remarkable. One case



referred to a high liver. He recovered and has not had a recurrence in these thirty years. I warned him when I saw his optic disc. His physician thought my fears were exaggerated, but in the second week he had hemiplegia. Another case was that of a lady, whom I saw a few months ago, who also had a hemiplegia, which was not so pronounced, and by dieting and watching her for about six weeks she was greatly improved, and got well later on.

These cases are not entirely incurable, and I think that the oculist has a large field before him to do an immense amount of good, chiefly in preventing this awful affliction. He now-a-days sees many of these patients in the initial stage of the arterio-sclerosis. The treatment is strict hygiene. Overeating is mostly the cause, then alcohol, and also to a certain degree nicotine. Daily, regular exercise is a necessity. The wealthy town people may take a half hour's chamber gymnastics after their bath in the morning before breakfast. Several treatises on diet and exercise are in the market; a very commendable one is by an English physician and has the title, "Diet in Relation to Age and Activity," by Dr. Thompson.

DR. WÜRDEMANN (closing discussion): Pathologically speaking, I think the criticism may be well made as to whether those cases are true embolisms, primary or secondary, or endarteriitis. Therapeutically speaking, it matters not what they are. They present the clinical picture as we know it from experience of the so-called embolism, and if we can dislodge this clot, whether from the heart or secondary, then we are doing some good in the only possible way by mechanical treatment. In several cases similar to the one reported by Dr. Knapp, I have seen it followed by endarteriitis, and there has been scotoma, and a blind spot in the field. It has been my fortune to have a section of an eye in which I found a clot in a central vessel. The case was one of thrombosis of the central vein with secondary formation of a clot in the arteries. I have the microscopic specimen in my laboratory. It was a case following mumps. Two weeks ago I saw a case of similar character, but in the first case the circulation was so arrested that secondary glaucoma set in and the eye was lost.

With reference to Dr. Woodruff's paper, I have seen the lymphagogenic action of dionin of great therapeutic value in inducing the absorption of retinal hæmorrhages. I saw two cases get their sight back, and I believe it was due to this. I believe in this case massage would do more harm than good. But where the thrombus forms in the vessel and is carried through, I believe massage is of great benefit.

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### SPONTANEOUS HÆMORRHAGE INTO THE VITREOUS.\*

BY THEODORE SCHNEIDEMAN, A.M., M.D.

Professor of Diseases of the Eye, Philadelphia, Polyclinic.

**H**ÆMORRHAGES into the vitreous humor are common enough. In the majority of such instances the bleeding is the result of a traumatism, so that in the presence of such cases the probabilities are always strong that the eye has been subject to external force. In fact, in some of the cases reported as instances of spontaneous hæmorrhage, a trivial injury is recorded as having preceeded the bleeding.

Another class of cases occur as the direct result of gross disease of certain of the ocular structures such as hæmorrhagic glaucoma, thrombosis of the central vein of the retina, choroiditis, retinitis, etc. Another group depends upon disturbances of the general circulation such as those accompanying menstrual anomalies, hæmorrhoids, etc.; while others have been found in diabetes and renal affections as well as in pregnancy.

The class of cases intended in this communication do not refer to any of the above divisions, but to those which may be truly called spontaneous, in the sense that no causative condition of the eye or general system can be found.

Of constitutional diseases, tuberculosis, pernicious anæmia, syphilis, malaria, are such as cause changes in the vessel walls, rendering them brittle. In such cases Friedenwald and Fehr have shown disease of the retinal veins. Friedenwald has observed perivasculitis with the ophthalmo-

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\*Read at the 10th annual meeting of the American Academy of Ophthalmology and Oto-Laryngology, Buffalo, Sept. 14th to 16th, 1905.

scope, while Fehr has seen with the microscope that the retinal vessels are thickened, narrowed in portions through hyaline degeneration, and even entirely blocked. Certain observers consider hereditary syphilis as the causative condition, a view which is strengthened by the fact that interstitial keratitis has been found in some cases.

These hæmorrhages are frequently not limited to a single occurrence, but recurrences are the rule. The subjects affected are generally young persons from the age of 15 to 20. In many of the reported cases both eyes were involved, but this is not invariable. Frequently, as in the two cases to be reported, no change whatever can be demonstrated in the organism as a whole or in the eye. The individual affected may present the appearance of rugged health. These spontaneous hæmorrhages are rare enough to warrant the suspicion in a given case that the eye has been subject to an injury. Careful investigation must always be made before the case in question can be allowed to be one of spontaneous or idiopathic hæmorrhage.

In these cases of hæmorrhage into the vitreous, it has been supposed by some that the source of the blood is different in different cases. In the one case the retinal vessels, in the other the ciliary, are the source of the hæmorrhage. Hæmorrhage from a ciliary vessel is supposed to be productive of more serious results than from a retinal vessel.

The prognosis depends upon the amount of blood effused and upon the question of relapses. The latter frequently take place; in fact are the rule so that the affection has by some been termed recurring hæmorrhage into the vitreous. As a rule the prognosis must be set down as unfavorable. If both eyes are affected it becomes a question as to the retention of useful vision. Detachment and atrophy of the retina with disorganization of the vitreous may be the final outcome.

The treatment of spontaneous and recurrent hæmorrhage into the vitreous is generally quite unsatisfactory. Fromaget<sup>1</sup> has had some success with the hypodermic injection of gelatine. In one case the result was remarkable. The patient had been blind in both eyes; after six injections he recovered good vision. Two years later both eyes were in good con-

dition. Darier<sup>2</sup> thinks he has seen results from the application of radium. A gramme of the salt was applied to the eye and another to the external lateral portion of the orbit, the whole being kept in position 24 hours by a bandage.

Mrs. A. D., aged 47, noticed to her dismay upon waking one morning that she was unable to see with her left eye. She was very sure that the difficulty, whatever it was, had come on since retiring the night before. She at once consulted her family physician, Dr. Louis Jurist, who referred her to me; so that I saw her the forenoon of the day upon which she made the discovery of ocular trouble, May 27, 1905. Examination of the eye showed that the vision was reduced to light projection. The fundus reflex was abolished; masses with a reddish tinge could be recognized in the vitreous; in fact it was possible to see some of these by oblique illumination. During the three months that have elapsed, the changes objectively observable have been but slight. There has been some return of a faint reflex at the upper and inner periphery, but no details of the fundus can be seen. Corresponding to this region of clearing there is some improvement of the vision in the opposite portion of the field where fingers can be counted, etc.

What was the cause of this extensive hæmorrhage which so suddenly destroyed the function of the eye? I have been unable to determine it. The patient has had no organic disease, although she seems anæmic. She had been living under considerable mental strain for some time. There is a curious circumstance connected or perhaps coincident with the case. The day preceding the discovery, the woman had had a tooth extracted which she was inclined to bring into connection with the sudden loss of sight in the eye. I learned from the dentist who extracted the tooth that there was nothing unusual about the operation. Nevertheless, I can not avoid the suspicion that this traumatism may have been the last straw which determined the rupture of a vessel which had been the seat of antecedent pathological changes.

Case 2nd. Young man aged 21, complained of the sudden appearance, June 6, 1905, of a cloud before the left eye. This cloud was a fixed obscuration, constituting in fact a positive scotoma. Everything "looked red." I had exam-

ined and refracted this patient eight months before, when the vision was full, the media clear, and the fundus normal. The refraction is low hypermetropia with low astigmatism. Examination now showed that the vitreous was quite cloudy, preventing a view of the details of the fundus, although a faint reflex was everywhere visible throughout the pupil. The opacity of the vitreous cleared up rather rapidly, so that at the end of a few weeks the media had become quite clear, while two separate hæmorrhagic regions were visible in the retina; the larger one seemed directly connected with a vessel above the macular region, while the smaller was about a disc diameter from this region toward the disc. These hæmorrhages have persisted; in fact, the larger one seemed to increase and again diminish.

In this case, too, nothing could be discovered in the general condition or the ocular structures to account for the bleeding. The young man appears to be healthy. As is commonly the case, patients seeking for some cause to which to attribute their illness, he tells of wrestling with a companion, but closer questioning does not connect this event with the discovery of the impaired vision.

<sup>1</sup>Fromaget, Treatment of Recurrent Hæmorrhages of the Vitreous by Injections of Gelatine Serum, *Ann. d'ocul.*, cxx, p. 165.

<sup>2</sup>Darier, Analgesic Action of Radium and of the Radio-Active Substances, *The Ophthalmoscope*, June, 1905.

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## CASES OF HÆMORRHAGE FROM THE EYE.\*

By ALVIN A. HUBBELL, M.D., Ph.D.

BUFFALO, N. Y.

EXTERNAL hæmorrhage from the eye, or its appendages, is so unusual that I deem the following cases worthy of placing on record.

### CASE I. *Hæmorrhage from the conjunctiva:*

A few years ago a child was born in the Buffalo Woman's Hospital, in the service of Dr. C. C. Frederick. To protect the child from ophthalmia neonatorum, the doctor ordered a single instillation of a two per cent. solution of nitrate of

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\* Read at the 10th annual meeting of the American Academy of Ophthalmology and Oto-Laryngology, Buffalo, Sept. 14th to 16th, 1905.



silver, and afterwards a weaker solution of the same—one-half grain to the ounce—in both eyes every four hours. The nurse misunderstanding the directions, instilled the two per cent. solution regularly every four hours. Within twenty-four hours the conjunctiva and eyelids were very much swollen and considerable pus was discharged. Believing that it was a case of ophthalmia neonatorum, the supposed weaker, although in reality the stronger, solution of nitrate of silver was continued. At the end of thirty-six hours, both eyes began to bleed. Dressing after dressing became saturated with blood, and soon the attendants became alarmed. I was called to the case, and found blood oozing continuously from the swollen conjunctiva. The lids were also much swollen, and on exposing the eyeballs with a small lid retractor, both corneæ were found to be quite opaque, the opacity being most dense at the lower portions. There was no ulceration or abrasion of either cornea.

I at once ordered all local "drops" to be discontinued, and the application of iced cloths over the eyes, limiting the area and effect as much as possible to the affected parts. These were kept on constantly for several hours, and cleanliness was secured by gently irrigating the lids and conjunctiva with boric acid solution. To-day I would use adrenaline solution, but the virtues of this drug were not known then. The hæmorrhage gradually lessened, but did not entirely cease until about twelve hours after the cold applications were begun. The child by this time was pale and much weakened. Recovery, however, was rapid. The swelling and inflammation gradually subsided, and the child soon regained its strength. Both corneæ remained more or less opaque, while the patient remained in the hospital, but I was afterwards informed that the child had useful vision.

CASE II. *Hæmorrhage from the eyeball:*

Rev. J. H. H., aged 65, began to have trouble with his left eye in November, 1903, complaining, at first, of sudden loss of vision. He consulted Dr. J. H. Sackrider of East Randolph, N. Y., who, with the ophthalmoscope, made a diagnosis of "hæmorrhagic retinitis." In January, 1904, the eye became inflamed and very painful, and the sight was



entirely destroyed. The use of anodynes and fomentations gave relief after a few days, and the eye was comfortable for a long time, but sight was never regained.

In the spring of 1905, the eye again became inflamed and painful. The patient was then treated by Dr. O. C. Shaw of Cassadaga, N. Y., but with only temporary relief. On June 3rd, 1905, during a severe attack, and to quote the language of the patient, "something dropped from the eye into my hand, about the size of a pea, and clear like gelatine. My wife took it out of my hand with a piece of paper and crushed it." This substance, undoubtedly, was the crystalline lens, and the incident shows that there was ulceration and perforation of the cornea. Immediately blood began to flow from the eye. "Dr. Shaw was close at hand," says the patient, "and came while the eye was bleeding. It must have bled several minutes. More than a pint of blood flowed out, and the pain was intense." Dr. Shaw administered remedies to stop the hæmorrhage, but it continued till the patient fainted. Dr. Shaw tells me that the quantity of blood may not have been a pint, but it was very large. That a large amount of blood was lost is evident, both from the statements of the patient and the physician, and from the fact that the patient fainted, and that he was afterwards so much weakened. The doctor did not determine the exact point of bleeding, but said that it was from the anterior portion of the ball.

I saw the patient at my office on June 5th, 1905, two days after the hæmorrhage took place. He was then pale and weak, and the eye was red and tender. Projecting from the center of the cornea was a small, flattened mass of disintegrating fibrin and vitreous humor. Under cocaine anæsthesia, I excised this with scissors, when I found a perforation of the center of the cornea about five millimetres in diameter. The remaining portions of the cornea were opaque. I applied pure carbolic acid to the area of perforation, and advised Dr. Shaw to repeat it twice or three times a week till healing was well under way, and to have the eye irrigated three or four times a day with a saturated solution of boracic acid.

I have seen the patient recently and find that the perfor-

ation has entirely healed, the cornea is opaque and shrunken, and the eyeball has become somewhat atrophied.

This case was, probably, glaucoma at the beginning, with, perhaps, retinal hæmorrhages. Subsequently the cornea became ulcerated and perforated, the walls of the choroidal vessels gave way as soon as the tension was removed by the perforation, and with the choroidal hæmorrhage the lens and more or less of the vitreous humor were forced out. That a choroidal hæmorrhage should thus find external vent, and should continue so long and so profusely is unexplainable by me, and so far as I know it is a very unusual, if not unique, occurrence.

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#### DISCUSSION ON

#### SPONTANEOUS HÆMORRHAGE INTO THE VITREOUS,

BY THEODORE SCHNEIDEMAN, M.D.

AND

#### CASES OF HÆMORRHAGE FROM THE EYE,

BY ALVIN A. HUBBELL, M.D., PH.D.

DR. DAYTON (Lincoln, Neb.): I came in late and did not have the pleasure of hearing Dr. Schneideman's paper; but speaking in a general way, it has been my lot to find but few true hæmorrhages into the vitreous. We find a great many sub-retinal hæmorrhages where the blood does not enter into the posterior chamber proper; and these hæmorrhages that enter into the vitreous chamber, in my opinion and also in the opinion of others that I have noted, have a tendency to come more from the anterior retinal vessels. Recently my attention has been called to a case of retinitis albuminurica occurring in rather a young person where there was an excessive hæmorrhage into the vitreous, about the macular region. The peripheral portion of the retina could be distinctly seen but nothing in the macular region.

I have had several instances of injuries by missiles, clods of dirt, etc., striking the eye, and in one case by a tennis racket, which provoked a hæmorrhage into the vitreous. In young people we would naturally not expect a case occurring due to an arterio-sclerosis; this is different in older people. I saw the case of a very aged person who had been

suffering from grip, with violent paroxysms of coughing and who was suddenly stricken blind from a vitreous hæmorrhage in one eye. Two or three days after that the patient's doctor informed me by the phone that the patient had also gone blind in the other eye. About a week after that I was called to see her again; and she had a general panophthalmitis in both eyes. She died about ten days after that. Here was a case in which there followed a total destruction of the eye from hæmorrhage into the vitreous. This, of course, is the very worst that may happen in those cases. Ordinarily the clot is absorbed or leaves flocculi floating in the vitreous as a sequel of a hæmorrhage. A number of years ago I saw a young girl who was struck in the eye with a clod of dirt and had an extensive hæmorrhage into the vitreous and the eye became so painful from the effects of it that sympathetic irritation followed and we were obliged to remove the eye.

True hæmorrhage into the vitreous is quite rare, when the many injuries that the eyes are subject to are taken into consideration. Especially is this true in young people. We would expect to find a greater tendency to hæmorrhage into the vitreous in people of maturer years, occurring during some organic disease or structural change in the walls of retinal bloodvessels.

DR. F. PARK LEWIS (Buffalo): Hæmorrhages into the vitreous may be due to one of two causes; first, local degenerative changes in the retinal vessels permitting rupture under normal pressure; second, some irritative condition of sufficient intensity to cause normal vessels to break. I have seen cases due to both conditions. The latter is often produced by eyestrain from some refractive error or muscular imbalance. In several cases otherwise without adequate explanation, I have seen pulmonary tuberculosis develop later, and have sought to determine whether there might not be an eyestrain which so lowered the general resistance as to make the patient vulnerable to the tubercular germ.

DR. PERCY FRIDENBERG (New York): I did not hear the paper and I may be repeating something already alluded to, and that is the recurrences of intraocular hæmorrhages in conditions of menstrual disturbances. I saw some years ago

an interesting case of this sort in which before it came on there was no evidence of intraocular disease. Dr. Lewis has called attention to two conditions, either local or systemic, which cause the vessels to give way. Here a girl arrived at the period of first menstruation without any symptom of local disease, and after the hæmorrhage her blood and renal and heart conditions were found to be normal. The first menstruation was scanty, and these hæmorrhages occurred and recurred at each period, and would partly clear up between times, but finally became so profuse that they would not clear up and the retina was detached. This took place in both eyes. I have colored drawings of this case, which I presented in Washington some years ago. I found that others had been reported, but the difference was that the patients were women at the menopause and who had recurrent hæmorrhages into the vitreous. Others have shown that these conditions are not limited to females. In young males there is a similar tendency and a menstrual wave. That is, there is a variation of arterial pressure to a certain extent resembling that of the menstrual changes, and a disposition to intro-ocular hæmorrhage in young boys at the time of puberty.

In reference to Dr. Hubbell's paper, with regard to hæmorrhages of the eye in the new-born, I had a case in which I could find no cause. There was no history of traumatism; the delivery was not instrumental, and the child was perfectly well. The symptoms got better under pressure bandage, and in about a week there was no clot. In another week there was the same condition in the other eye, and then again in the first, and then hæmorrhages and relapses, and this was followed by other symptoms of infantile scurvy (Barlow's disease). The ocular hæmorrhages were symptomatic of this affection.

DR. BERNSTEIN (Kalamazoo): I should like to call your attention to a case in a boy of 14, which had been thought to be due to excessive masturbation. This case was reported to the *Annals of Ophthalmology*, with illustrations, showing the fibrous changes which eventually occurred in the vitreous, as a result of repeated hæmorrhages. Eventually the whole vitreous was a mass of fibrous bands.

DR. HUBBELL (Buffalo): I would like to speak on the subject of intra-ocular hæmorrhage. Out of a pretty large number of patients, I can recall at this time five cases of recurrent hæmorrhage in the vitreous humor, four of which were men, two of these being 22 or 23 years old, and two were in middle life. The fifth case was a woman about 65 years of age. In every case the hæmorrhage recurred at irregular intervals and would, as a rule, become absorbed without leaving any great disturbance of vision. On one occasion, however, the hæmorrhage in the left eye of one of the young men was large and the vision remained impaired. As to the causation, I have no explanation. In one case there was a doubtful history of syphilis, but in the others I have no theory as to the cause of the hæmorrhages. As to the sequelæ, they were very interesting to me. One young man had cataract, and I was told that Dr. F. Park Lewis operated on him. I do not know how much vision was left. The other young man is still under my observation. In this case retinitis proliferans has developed in both eyes. The blood has entirely absorbed in the right eye, but in the left vitreous there are numerous floating opacities and the vision is poor. I feel that we know very little about the causation of recurrent hæmorrhages into the vitreous humor, or what they will lead to.

DR. GEORGE M. GOULD (Philadelphia): I wish to emphasize the fact that eyestrain is the cause of the condition in many of these cases. This has been demonstrated in several instances in my own practice, and Dr. Lewis has found them in his. Some years ago I reported a case of subconjunctival hæmorrhage in a man of 50. For several years these hæmorrhages had occurred in either or both eyes, and frequently the entire visible space between the conjunctiva and sclerotic suddenly filled with blood, and without discoverable cause. This gave the man no particular physical discomfort, but it produced a hideous appearance and his friends began thinking him a dissipated man. He had been treated by many of our best oculists, but their diagnosis was uniformly gout. They could find no error of refraction, because no mydriatic had been used. I corrected O. 25 D. of myopic astigmatism and there has been no hæmorrhages for ten

years. Although his eyes had been pronounced "mathematically perfect," eyestrain was the cause of his hæmorrhages. The condition of the capillaries which rendered them so unresistant may have been due to gout or to other things, but the precipitating cause was eyestrain.

Suggested by Dr. Hubbell's report of a case of bleeding from the conjunctiva, I wonder in how many children we have caused blindness by nitrate of silver. Years ago I know I was guilty of using too strong solutions of this preparation. In my first year of practice, relying on what I had been taught, I had many instances of such hæmorrhages caused by using 10-grain or 20-grain solutions. Not only were the capillaries corroded, but corneæ were rendered opaque. I have found that frequent washing out of the sulci with weak astringent and antiseptic solutions is as effective as the strong silver applications. It occurred to me that in Dr. Hubbell's case the hæmorrhage was due to the nitrate of silver. If so, it supplies the caution that we should at least use the weaker solutions.

DR. YOUNG (Burlington, Iowa): I have seen a case of vitreous hæmorrhage in the past month, in a young man of 30, married, of good habits, who has for years had chronic albuminuria. This case was subsequently seen by Dr. Hotz of Chicago, referred by Dr. Billings because of the fact that I drew a connection between the hæmorrhage and the albuminuria. The patient was assured by Dr. Billings that there were no vessel changes as a result of his long course of albuminuria. The hæmorrhage was in the macular region, deep down, and an examination of the periphery of the fundus, both on the temporal and nasal side, discovered white patches and characteristic hæmorrhages. I have been unable to see why one should not account for the vitreous hæmorrhage as a result of the albuminuric process.

I have also seen a case of extensive subconjunctival hæmorrhage in a man of 50, so extensive that the conjunctiva almost projected between the lids.

Twenty-six years ago I saw a case of recurrent hæmorrhage into the areolar tissue of the lids; complete ecchymosis of the lids, apparently, without injury. This was in a clerk in a drygoods store. On change of occupation the hæmor-



rhages ceased. He looked as though he had been in a fight, both eyes blackened, the skin of the lid as black as his hat.

Dr. Gould has brought up the subject of putting out the eyes of children in trying to prevent ophthalmia neonatorum. Since reading an article published in Alt's journal last year, I have come to believe that whatever accident has happened has been from doing Crédé *not* as Crédé described it. Over 30,000, as shown in this report, have shown no accident where Crédé's method has been followed. So many do not use it as he uses it. So when we say we do not get good results, it is because we do not use the method as directed.

DR. L. A. W. ALLEMAN (Brooklyn, N. Y.): I have seen a case relieved by a proper correction of errors of refraction. As to the effects produced by nitrate of silver, I think if you will use a solution made from the fused stick you will not have trouble. In a solution made from the crystals there is a certain amount of free acid, which is irritating. Since using solutions made from fused silver, I have had no undue reaction following the use of even comparatively strong solutions of silver nitrate.

DR. A. ALT (St. Louis): With regard to the hæmorrhage of infants after the use of nitrate of silver according to Crédé's method, there was a case in St. Louis, in which Crédé's method was used correctly, by dropping from a glass rod one drop of a 2 per cent. solution of nitrate of silver on the cornea, not into the conjunctival sac, and a few hours afterwards there was an oozing of blood from the conjunctiva, which no treatment could stop, and in spite of using even pure adrenaline—which I, however, have never seen to stop a hæmorrhage—the bleeding kept on until the child died in a week from exhaustion. I do not believe one drop of nitrate of silver could have done that. The child may have been a bleeder. Such things can happen, I think. Similar cases have been reported by others. However, if you are afraid of using the nitrate of silver, protargol or argyrol, even in very weak solutions, seem to act as well as silver nitrate. By far, not all the cases which have been reported as having been treated by Crédé's method, have in reality been so treated correctly.

DR. EUGENE N. S. RINGEBERG (Lockport, N.Y.): I have seen a few cases, and I do not think the nitrate, unless strong, has very much effect.

DR. WEEKS (New York): I want to add my testimony also to the bad effect of the nitrate of silver in some cases. I saw one case in which the hæmorrhage was very profuse after the use of 2 per cent. solution of the nitrate of silver, but it did not last more than twelve hours. In my opinion, if the nitrate of silver is used as Crédé directs, by the surgeon or by the attending physician—one drop put into the eye from the end of a glass rod—the danger is very slight, but if left to the attendant, more than one drop is usually put in, and there is danger of undue reaction. The preparations of silver known as protargol and argyrol used after the Crédé method, in the strength solution of 10 per cent. and 35 per cent. respectively, are not harmful to the patient, and are as sufficient as is the nitrate of silver.

DR. SCHNEIDEMAN (closing discussion of his paper): In looking over some of the reports that have been published, I have been struck by the readiness of the reporter to ascribe the condition to syphilis without other evidence, past or present, that the patient had suffered from that disease.

I recall one case, not indeed of spontaneous hæmorrhage into the vitreous, but where this condition was due to a traumatism, in which the blood became organized into a membrane. There was no fundus reflex and the sight was entirely gone. Dr. Jackson operated upon this patient at the Philadelphia Polyclinic, dividing the membrane back of the lens through the sclera with a knife. The man recovered and retained a very fair degree of sight. The vitreous contained some opacities, but from no vision there was useful vision up to the time of his death ten or twelve years later.

## REPORT OF A CASE OF ELECTRIC OPHTHALMIA.\*

By EDWARD B. HECKEL, M.D.

PITTSBURG.

VISUAL disturbances resulting from over-stimulation, or exhaustion of the retina as a result of prolonged exposure, are sufficiently rare to warrant the presentation of the following case. Unfortunately I did not see this patient during the acute stage, but obtained the following history which is sufficiently interesting.

The patient, age 28, an electrical engineer in one of our neighboring towns, presented himself on March 10, 1905, with the following history: On December 31, 1904, he was engaged in burning out a plugged twyer in a blast furnace. A twyer is a tube through which air is forced into a blast furnace. At times there is a choking of the furnace with some solid material which suddenly drops and splashes the molten metal into one of these openings and thus plugs it. The method of removing this obstacle is to connect the positive end of a charged wire to the plug and then hold the negative end in front of it, and thus establish an electric arc which melts and burns out the iron plug. He used a current of 400 ampères and consumed four hours in burning out the plug. In other words his eyes were exposed to this intense arc-light produced by 400 ampères for four hours, during which time he had his eyes protected by a pair of cobalt glasses.

Soon after the exposure the eyes became very painful, the conjunctiva red and swollen, and a general erythema of the lids and surrounding skin appeared, which peeled off not unlike after a sun-burn. These severe symptoms disappeared within a few days, and then he noticed a large central scotoma which gradually contracted so that when he presented himself to me it was about an inch in diameter at a distance of 20 feet or more and scarcely noticeable at a working distance, so small that I failed to obtain it with the perimeter. His vision at this time (March 10) with the right eye was  $20/20$ , and with the left eye  $20/40$ . The eyes at this time presented

\*Read at the 10th annual meeting of the American Academy of Ophthalmology and Oto-Laryngology, Buffalo, Sept. 14th to 16th, 1905.

a perfectly normal appearance; the ophthalmoscope showed both fundi to be quite normal. At this time he was ordered to take  $\frac{1}{15}$  grain of strychn. sulph. three times daily and asked to refrain from close work as much as possible. He reported on March 22 as having improved quite a little. His vision at this time, with the right eye was  $\frac{20}{20}$  and the left eye  $\frac{20}{30}$  minus. He was asked to continue the strychn. sulph., and reported April 26, when the vision of the right eye was  $\frac{20}{20}$  and the left eye  $\frac{20}{20}$  minus and no scotoma.

Strychn. sulph. was given upon general principles; the same recovery might have taken place without anything. The most interesting feature in this case is to explain the pathological changes. I believe it to be a retinal exhaustion of those chemical elements necessary for vision; and that in addition to these there may have been some changes in the anterior layers of the retina which prevented the light from passing through to the light-perceiving stratum of rods and cones.

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#### OBITUARY.

SWAN M. BURNETT.

Ophthalmology, American Ophthalmology and especially this Journal, have suffered another serious and deplorable loss. Dr. Swan M. Burnett of Washington, D. C., died in January. An ardent worker, a scientific mind and a thorough gentleman, he has left his foot-prints behind him in every ophthalmic journal of this country and in a number of foreign ones. His larger work on astigmatism and the chapter on corneal and conjunctival affections which he contributed to the Norris-Oliver encyclopedia, secure for him a lasting place among the scientific workers in our specialty.

From its beginning he was an untiring supporter of this Journal. We mourn his death and our loss of a true friend and collaborator. He was one of the few whom we can ill afford to do without.

## BOOK REVIEWS.

ENCYCLOPÉDIE FRANÇAISE D'OPHTALMOLOGIE, By F. LAGRANGE and E. VALUDE. Vol. V, with 156 illustrations in the text. Paris: Octave Doin. 1906.

This the fifth volume of the great French encyclopedia of Ophthalmology contains chapters on glaucoma, sympathetic affections, affections of the lids, tumors of the lids, affections of the conjunctiva, cornea and sclerotic, and tumors of the conjunctiva, cornea and sclerotic. It goes without saying that authors like Da Gama Pinto, Terson, Lagrange, Morax and Rohmer stand for nothing if not for excellence. It is a great treat to study this volume. Nothing of the slightest importance seems to have been overlooked in the text as well as in the bibliography attached to each chapter.

DIE SERUMTHERAPIE BEI INFECTIÖSEN AUGENKRANKHEITEN (Serum therapy in infectious eye affections), By DR. THEODOR AXENFELD. Freiburg, i. B. Universitäts-Buchdruckerei. 1905.

The well known author, who is the authority on the bacteriology of the eye, gives in this book a review of all that is known concerning pathogenic bacteria in the eye and the attempts of treatment with antiserums. To this he adds his own experiences with this therapy in diphtheritis, pneumococcus infection of the cornea (Roemer's serum), streptococcus infection and staphylococcus infection. He ends with the remark that the serum therapy in infectious eye affections is not only a fruitful field for scientific exploration, but that it also shows some preventative and curative results, although it has not yet come up to all expectations. From beginning to end the book is full of interesting material.

PHYSIOLOGIE DE LA LECTURE ET DE L'ÉCRITURE (Physiology of reading and writing), By E. JAVAL. 96 illustrations. Felix Alcan, Paris: 1905.

Having given the history of the evolution of printing, stenography and musical writing, the author adds chapters on optics and the mechanism of reading printed or written matter, with special reference to the reading and writing of the blind. The volume is addressed to the general public, and the author has admirably succeeded in bringing the sub-

ject in such a form that everybody can understand it and read it with lasting profit.

**THE CHANGES PRODUCED BY INFLAMMATION IN THE CONJUNCTIVA,** By M. S. MAYOU, F.R.C.S. John Ball, Sons & Danielsson. London: 1905.

The book is the result of the author's work in the study of cell changes in the conjunctiva due to injuries and inflammatory conditions, more especially in xerosis, lymphoma, gonorrhœa, Koch-Weeks and diplobacillus infection, trachoma, vernal catarrh and phlyctenular conjunctivitis. In all of these affections the "plasma cells" form an important part. The work contains much that is original and is full of evidence of careful and painstaking study. Most of the 44 illustrations are very good.

**SKIASCOPY AND ITS PRACTICAL APPLICATION TO THE STUDY OF REFRACTION,** By EDWARD JACKSON, A.M., M.D. 4th edition. 28 illustrations. Herrick Book & Stationery Co., Denver, Col.: 1905.

The new edition of this well known and excellent treatise is revised and slightly enlarged. We have at former occasions given this book our highest recommendation and can only repeat it.

**THE PATHOLOGY OF THE EYE,** By J. HERBERT PARSONS. Vol. II: Histology, Part II. G. P. Putnam's Sons, New York. Hodder & Stoughton, London. 1905.

This the second volume of Parsons' pathology of the eye deals with the lens, vitreous body, choroid, retina, optic nerve, orbit (tumors) and the lacrimal apparatus. It is in every way an excellent work, which shows an intimate knowledge of the subject treated on and of the literature pertaining to it. While expressing his own views on all doubtful points, the author does full justice to the views of others. The illustrations, as a rule, are good, well chosen and to the point. There are some minor points with which the reviewer does not agree, and he wishes especially to point out that, contrary to Parsons' criticism, the author's two cases of intra-ocular sarcoma with cartilage formation, are not "errors of observation." No one interested in eye diseases can afford to be without this excellent treatise.

ALT.